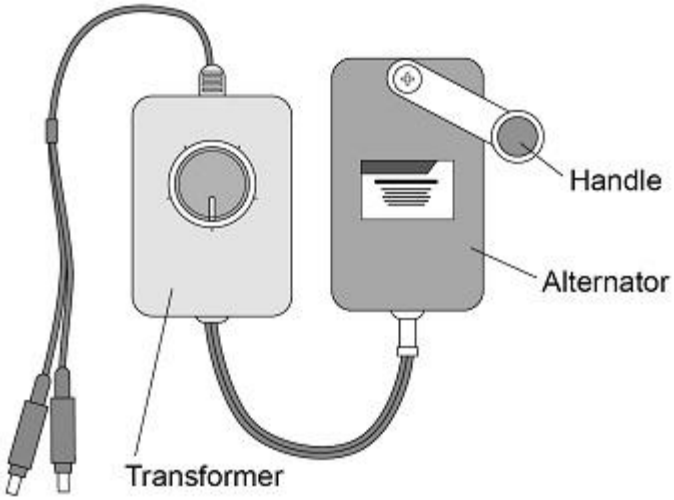
Name of the Student:_____

Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

Figure 1 shows a portable power supply.

Figure 1



(a) The portable power supply has an alternator connected to a transformer.

The transformer can be adjusted to have different numbers of turns on the secondary coil.

Suggest why.

_____

_____

_____

_____

(2)

(b) A lamp is connected to the power supply.

The lamp requires an input potential difference of 5.0 V.

The alternator generates a potential difference of 1.5 V.

The primary coil of the transformer has 150 turns.

Calculate the number of turns needed on the secondary coil.

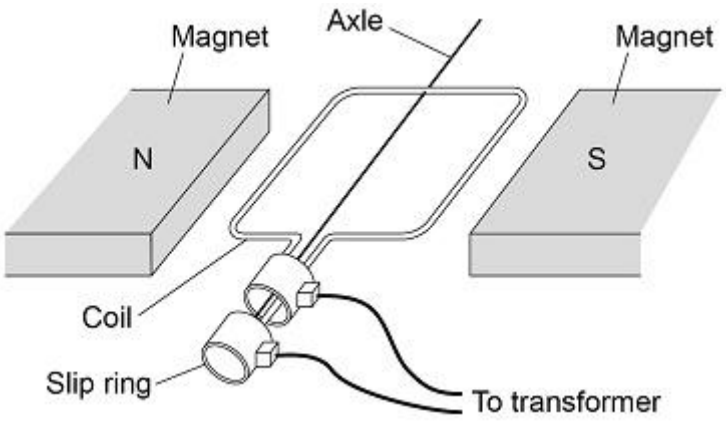
_____

Number of turns on the secondary coil = _____

(3)

Figure 2 shows the inside parts of the alternator.

Figure 2



(c) The handle of the alternator is turned, causing the coil to rotate.

Explain why an alternating current is induced in the coil.

(5)

(d) Suggest the purpose of the slip rings.

_____

(1)

(e) The alternator from the portable power supply is disconnected from the transformer and lamp.

Explain why the handle of the alternator becomes much easier to turn.

_____

_____

_____

_____

_____

_____

(3)

(Total 14 marks)

Q2.

(a) The table below gives the frequencies in the hearing ranges of five different animals.

Animal	**Frequencies of hearing range**
Cat	55 Hz to 77 kHz
Chicken	125 Hz to 2 kHz
Dog	20 Hz to 30 kHz
Gerbil	56 Hz to 60 kHz
Horse	55 Hz to 33 kHz

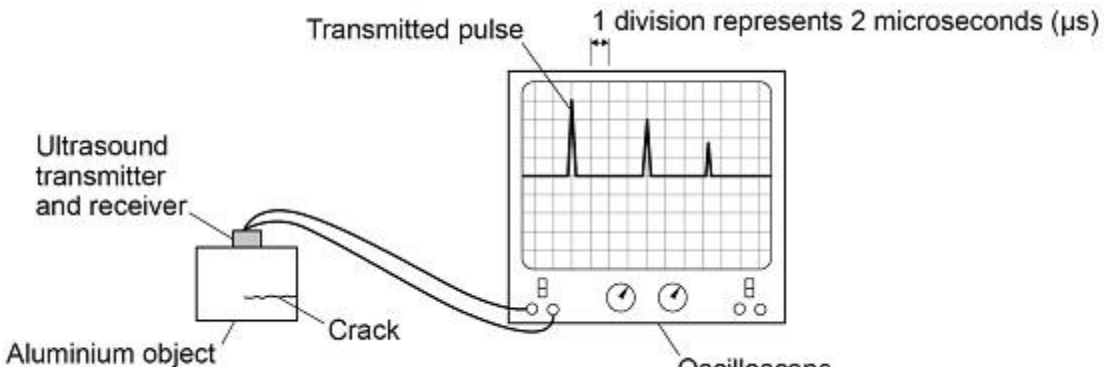
Which **one** of the animals from the table would not be able to hear ultrasound?

_____

(1)

Figure 1 shows ultrasound being used to detect a hidden crack in a solid aluminium object. The transmitted and reflected pulses of ultrasound are shown on the screen.

Figure 1



(b) Which of the following is the same as 2 microseconds?

Tick (✓) **one** box.

2×10^{3} s ☐

2×10^{-3} s ☐

2×10^{-6} s ☐

2×10^{-9} s ☐

(1)

(c) Ultrasound travels at 6300 m/s in aluminium.

Determine the depth of the crack below the top surface of the aluminium.

Use information from **Figure 1**.

Give your answer to two significant figures.

_____

_____

_____

_____

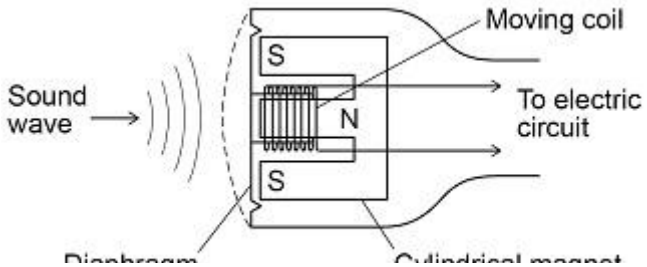
_____

Depth = _____ m

(4)

Figure 2 shows the parts of a moving-coil microphone.

Figure 2



(d) What is the function of a microphone?

_____

_____

(1)

(e) Explain how a moving-coil microphone works.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 11 marks)